

terior lip of the buccal opening forms a cushion-like projection, near which on each side there is a chitinous plate, from which two curved chitinous filaments run outwards. From the mouth a *single* hook can be protruded; this is situated in the depths of the cavity, and attached to a strong chitinous framework.

*Second stage* (the duration of which may be estimated at thirty-six hours).—The two posterior stigmata are on each side enclosed in a chitinous ring. On the second segment, on both sides, a series of 7–8 new, small air-holes has been formed; these stand close together and open into the same main trachea. The number of hooks in the mouth is increased to two; and these are connected not only with the framework, which has remained essentially unchanged, but also with a transverse chitinous arc, which belongs to the lower lip, and moves up and down in the same way as the lower jaw of a vertebrate animal. From the lateral extremity of this arc there issues, instead of two, a great number of chitinous filaments, which radiate in a fan-like form to the lateral parts of the cephalic segment. Other solid buccal organs are wanting.

*Third stage* (up to the pupal change).—With three stigmata on each side at the posterior extremity. The margin of the latter has become drawn out into a number of conical processes. In other respects it agrees with the second stage.

The second and third stages are introduced by a change of skin, which extends to the tracheæ in the manner described by me in the *Pupipara*.—*Wiegmann's Archiv*, 1861, p. 60.

*On the Structure of the Brain in Man and the Apes, and its relation to the Zoological System.* By RUDOLPH WAGNER, Professor at Göttingen.

The following is a short abstract of a paper recently published in Wiegmann's 'Archiv für Naturgeschichte' (1861, pp. 63–80).

The author commences by giving a detailed account of the publications of Owen, Huxley, and Gratiolet relating to the subject. The latter, who has lately compared the brain of Microcephali with those of Apes\*, arrives at the conclusion that Man, in his physical organization, differs as absolutely from the highest animals, as in the development of his psychical qualities,—a view with which Prof. Wagner entirely agrees.

The author having had little opportunity of examining fresh cerebra either of extra-European races of Men or of Apes, has arrived at his opinion less from his own direct observations than from the study of the works of Tiedemann, Leuret, Owen, and Gratiolet. He has, however, obtained casts of the brains of different races of Man, of a microcephalic individual who attained to the age of thirty-one years, and of several Orangs of different ages, by cutting the skulls in two in the direction of the *sutura sagittalis*, and by filling them with plaster of Paris.

\* Comptes Rendus, 1860, no. 18, and Mém. Soc. Anthropol. Paris, i. 1860, p. 64.

With regard to the use of the structure of the brain as a character for systematic division, the author is decidedly of opinion that it will prove to be of no greater value than other isolated characters, like those used by Müller and Agassiz for the classification of fishes. He says that every single character, even when it appears to be constant for long series of animals, suddenly proves to be deficient, leaving wide gaps, forcing us to make exceptions, and thereby destroying the necessary generality. It is the mutual relation of the single organs to one another, the structure of the single parts and elements in their combination, which must guide us in our systematic attempts, rather than the presence of very subordinate internal or external peculiarities of a single organ. There is much that is ingenious and worthy of consideration in Owen's attempt to use the convolutions of the brain, &c., for the classification of Mammals; and we might perhaps expect, from the importance of the organ, to obtain from it general relations, the fluctuations of which in subordinate characters may be more easily explicable.

In the special examination of the convolutions, it will always stand as a strange fact, that animals so highly organized and having so high a psychological development as Birds, have the surface of the hemispheres smooth and without folds, like mammals of low organization. Even in Man, moreover, the fact of the existence of a great number of folds in very intellectual individuals is not without exceptions.

On the other hand, it is true that the typical arrangement of the convolutions and the formation and structure of the individual lobes of the cerebrum are in intimate connexion with the groups, orders, and families of our system, and that only those animals which belong to one natural group can be compared with one another with regard to the higher or lower development, arrangement of lobes, and number and course of the convolutions. Considering this, we are compelled to say that, in a *broad* sense, Man must be placed in one and the same group with the *Quadrumana* as regards the structure of his brain, but in a *narrower* sense, that he forms a separate group by himself. This applies to the structural *ensemble* of the arrangement of the brain, the stages of development, and the configuration of the principal convolutions; but it is difficult to see how relatively very unimportant parts of the brain, which are subject to great variations even in single human individuals (*e. g.* the shorter or longer *cornua posteriora ventriculi lateralis*, the presence of a *pes hippocampi minor*, simple or double *eminentiæ candicantes*), can be brought forward as more or less essential characters of the human brain, distinguishing it from that of the anthropoid Apes. There is not only a striking similarity between both in the whole of their external appearance, but this similarity also extends to the different stages of development of the human brain, if we compare them with the different forms of the lower-organized small Monkeys and of the highly developed anthropoid Apes.

The author, finally, confirms Gratiolet's observation, that the brain

of microcephalic individuals is far from approaching that of Monkeys; it is more dissimilar to the latter than the human brain of normal structure, the occipital and parietal lobes being much reduced, leaving the cerebellum uncovered. There is, therefore, no transition from the human brain to that of Monkeys, any more than from the human skull to that of the Ape. When we take into consideration all that we know of normal and abnormal structure in Man and the Ape, we find that both are as widely separated from each other (*i. e.* without any intermediate forms) as mammals and birds, as *Ornithorhynchus* and *Struthio*. Everything in zoology and physiology contradicts those far-going, genealogical affinities, metamorphoses, and transitions which are demanded by Darwin. "*Man and Monkey are creatures primitively and absolutely distinct, even if we ignore all psychological considerations.*"

*On the Spermatophora of some Hirudineï.* By M. C. ROBIN.

The author has discovered the occurrence of Spermatophora in *Nepheleis*, in which they present remarkable peculiarities. They pass entirely from the reservoir in which they are produced into the female apparatus before the latter contains any trace of ovules; so that in these animals, contrary to what takes place in others, the fecundating fluid arrives in the female organs before they contain any eggs. It is only after the penetration of the spermatophora that the eggs make their appearance in the interior of these bodies, the size of which increases in proportion to the growth and number of the ovules. From being spermatophora in the male organs, they become ovo-spermatophora in the ovarian tubes.

At the period of copulation each of the ovoid sacs which terminate the male apparatus of the *Glossiphoniæ* is filled with a spermatophore, which nearly exactly reproduces its form, and the two also unite by a common extremity in the simple portion of the canal which opens at the male genital pore.

On separating these Annelides from each other during copulation, the two spermatophora may be seen issuing from the genital pore of the male: sometimes they have only partially escaped; sometimes they are entirely extruded, and adhere to the body of one or other of the animals. They are of a brilliant silvery white colour and of a most elegant form. They are 3 millim. in length and  $\frac{1}{3}$  millim. in diameter. They are club-shaped, with the large extremity turned backwards and prolonged into a fine, slightly curved point, the length of which is equal to or greater than the greatest diameter of the spermatophore; they terminate in front in a slender portion nearly as long as the thickened part; they have a common cavity anteriorly for about one-fourth of their total length.

Each spermatophore fills the cavity of the sac which terminates the male generative apparatus. The elongated point of the thick extremity is engaged in the flexuose genital duct; the common portion corresponds with the single duct which opens at the genital pore. The wall of the spermatophore is from  $\frac{4}{100}$  to  $\frac{6}{100}$  millim. in